

PRELIMINARY AMENDMENT

U.S. Appln. No.: [Continuation based on 09/124,651]

- 31
- SCANNED, # 16
- c) recrystallizing the salt in a second organic solvent to form a first crystallized product;
 - d) dissolving the crystallized product in a third organic solvent with reflux;
 - e) adding a fourth organic solvent to form a second reaction mixture;
 - f) maintaining the second reaction mixture to form a second crystallized product and recrystallizing the second crystallized product under the same conditions to obtain a crystallized salt;
 - g) dissolving the crystallized salt in water in the presence of a fifth organic solvent to form a third reaction mixture;
 - h) alkalizing the third reaction mixture to pH 11, collecting a first organic phase, extracting a remaining aqueous phase with a sixth organic solvent to obtain a second organic phase, collecting second organic phase, and recombining the first and second organic phases;
 - i) washing the recombined organic phases in water, then drying over magnesium sulfate, then filtering;
 - j) evaporating the solvent and recrystallizing the resulting product in a seventh organic solvent to obtain a dextrorotatory zopiclone isomer.

6. The method according to claim 5, wherein the first crystallized product has a melting temperature of 160-165°C and a rotatory power of $[\beta]_D^{20} = 83^\circ$ (c = 0.5; acetone).

PRELIMINARY AMENDMENT

U.S. Appln. No.: [Continuation based on 09/124,651]

7. The method according to claim 5, wherein the second reaction mixture is maintained for 1 hour at 5°C.
8. The method according to claim 5, wherein the crystallized salt has a melting temperature of 160-165° C and a rotatory power of $[\beta]^{20}_D = 102^\circ$ (c= 0.5; acetone).
9. The method according to claim 5, wherein the alkalizing of the third reaction mixture is achieved by the slow addition of a basic aqueous solution.
10. The method according to claim 5, wherein the dextrorotatory zopiclone isomer has a melting temperature of 206.5° C and a rotatory power of $[\beta]^{20}_D = 135^\circ \pm 3^\circ$ (c = 1.0; acetone).
11. The method according to claim 5, wherein the optically active acid is D(+)-O,O'-dibenzoyltartaric acid.
12. The method according to claim 5, wherein the first, third, fifth and sixth organic solvent is a halogenated aliphatic hydrocarbon.
13. The method according to claim 12, wherein the halogenated aliphatic hydrocarbon is dichloromethane, a nitrile, or combinations thereof.
14. The method according to claim 13, wherein the nitrile is acetonitrile.
15. The method according to claim 5, wherein the pharmaceutically acceptable salts are salts of mineral acids, or substitution derivatives thereof, selected from the group consisting of chlorohydrates, sulfates, nitrates, and phosphates.
16. The method according to claim 5, wherein the pharmaceutically acceptable salts are salts of organic acids, or substitution derivatives thereof, selected from the group consisting

PRELIMINARY AMENDMENT

U.S. Appln. No.: [Continuation based on 09/124,651]

of acetates, propionates, succinates, benzoates, fumarates, tartates, theophyllineacetates, salicylates, phenolphthalinates, and methylene-bis- β -oxynaphthoates.

17. A method of treatment of a dysfunction in the central nervous system of a human comprising administering to a human in need of such treatment, a therapeutically effective amount of 6-(5-chloro-2-pyridyl)-5-[(4-methyl-1-piperazinyl)-carbonyloxy]-7-oxo-6,7-dihydro-5H-pyrrolo [3 ,4-b] pyrazine, or a pharmaceutically acceptable salt thereof, in the form of its dextrorotatory isomer.

18. The method according to claim 17, wherein 6-(5-chloro-2-pyridyl)-5-[(4-methyl-1-piperazinyl)-carbonyloxy]-7-oxo-6,7-dihydro-5H-pyrrolo [3 ,4-b] pyrazine, or a pharmaceutically acceptable salt thereof, in the form of its dextrorotatory isomer, is administered orally as a solid as a tablet, pill, powder or granule; orally as an emulsion, solution, suspension, syrup, or elixir; parenterally; or rectally.

19. The method according to claim 18, wherein the therapeutically effective amount administered is from about 2.5 mg to about 15 mg per day.

20. The method according to claim 17, wherein 6-(5-chloro-2-pyridyl)-5-[(4-methyl-1-piperazinyl)-carbonyloxy]-7-oxo-6,7-dihydro-5H-pyrrolo [3 ,4-b] pyrazine, or a pharmaceutically acceptable salt thereof, in the form of its dextrorotatory isomer, is administered together with a pharmaceutically acceptable carrier.

21. A method of induction of hypnosis in a human comprising administering to a human in need of such induction, a therapeutically effective amount of 6-(5-chloro-2-pyridyl)-5-

PRELIMINARY AMENDMENT

U.S. Appln. No.: [Continuation based on 09/124,651]

[(4-methyl-1-piperazinyl)-carbonyloxy]-7-oxo-6,7-dihydro-5H-pyrrolo [3 ,4-b] pyrazine, or a pharmaceutically acceptable salt thereof, in the form of its dextrorotatory isomer.

22. The method according to claim 21, wherein 6-(5-chloro-2-pyridyl)-5-[(4-methyl-1-piperazinyl)-carbonyloxy]-7-oxo-6,7-dihydro-5H-pyrrolo [3 ,4-b] pyrazine, or a pharmaceutically acceptable salt thereof, in the form of its dextrorotatory isomer, is administered orally as a solid as a tablet, pill, powder or granule; orally as an emulsion, solution, suspension, syrup, or elixir; parenterally; or rectally.

23. The method according to claim 22, wherein the therapeutically effective amount administered is from about 2.5 mg to about 15 mg per day.

24. The method according to claim 21, wherein 6-(5-chloro-2-pyridyl)-5-[(4-methyl-1-piperazinyl)-carbonyloxy]-7-oxo-6,7-dihydro-5H-pyrrolo [3 ,4-b] pyrazine, or a pharmaceutically acceptable salt thereof, in the form of its dextrorotatory isomer, is administered together with a pharmaceutically acceptable carrier.

25. A method of sedation of a human comprising administering to a human in need of such sedation, a therapeutically effective amount of 6-(5-chloro-2-pyridyl)-5-[(4-methyl-1-piperazinyl)-carbonyloxy]-7-oxo-6,7-dihydro-5H-pyrrolo [3 ,4-b] pyrazine, or a pharmaceutically acceptable salt thereof, in the form of its dextrorotatory isomer.

26. The method according to claim 25, wherein 6-(5-chloro-2-pyridyl)-5-[(4-methyl-1-piperazinyl)-carbonyloxy]-7-oxo-6,7-dihydro-5H-pyrrolo [3 ,4-b] pyrazine, or a pharmaceutically acceptable salt thereof, in the form of its dextrorotatory isomer, is administered

PRELIMINARY AMENDMENT

U.S. Appl. No.: [Continuation based on 09]

orally as a solid as a tablet, pill, powder or granule; orally
syrup, or elixir; parenterally; or rectally.

27. The method according to claim 24, wherein the therapeutic
administered is from about 2.5 mg to about 15 mg per day.

28. The method according to claim 25, wherein 6-(5-chloro-2-pyridyl)-5-[(4-methyl-1-piperazinyl)-carbonyloxy]-7-oxo-6,7-dihydro-5H-pyrrolo [3,4-b] pyrazine, or a pharmaceutically acceptable salt thereof, in the form of its dextrorotatory isomer, is administered together with a pharmaceutically acceptable carrier.

29. A method of relaxation of muscles in a human comprising administering to a human in need of relaxation, a therapeutically effective amount of 6-(5-chloro-2-pyridyl)-5-[(4-methyl-1-piperazinyl)-carbonyloxy]-7-oxo-6,7-dihydro-5H-pyrrolo [3,4-b] pyrazine, or a pharmaceutically acceptable salt thereof, in the form of its dextrorotatory isomer.

30. The method according to claim 29, wherein 6-(5-chloro-2-pyridyl)-5-[(4-methyl-1-piperazinyl)-carbonyloxy]-7-oxo-6,7-dihydro-5H-pyrrolo [3,4-b] pyrazine, or a pharmaceutically acceptable salt thereof, in the form of its dextrorotatory, is administered orally as a solid as a tablet, pill, powder or granule; orally as an emulsion, solution, suspension, syrup, or elixir; parenterally; or rectally.

31. The method according to claim 30, wherein the therapeutically effective amount administered is from about 2.5 mg to about 15 mg per day.

32. The method according to claim 29, wherein 6-(5-chloro-2-pyridyl)-5-[(4-methyl-1-piperazinyl)-carbonyloxy]-7-oxo-6,7-dihydro-5H-pyrrolo [3,4-b] pyrazine, or a

PRELIMINARY AMENDMENT

U.S. Appln. No.: [Continuation based on 09/124,651]

pharmaceutically acceptable salt thereof, in the form of its dextrorotatory isomer, is administered together with a pharmaceutically acceptable carrier.

33. A method of tranquilization of a human comprising administering to a human in need of such tranquilization, a therapeutically effective amount of 6-(5-chloro-2-pyridyl)-5-[(4-methyl-1-piperazinyl)-carbonyloxy]-7-oxo-6,7-dihydro-5H-pyrrolo [3,4-b] pyrazine, or a pharmaceutically acceptable salt thereof, in the form of its dextrorotatory isomer.

34. The method according to claim 33, wherein 6-(5-chloro-2-pyridyl)-5-[(4-methyl-1-piperazinyl)-carbonyloxy]-7-oxo-6,7-dihydro-5H-pyrrolo [3,4-b] pyrazine, or a pharmaceutically acceptable salt thereof, in the form of its dextrorotatory isomer, is administered orally as a solid as a tablet, pill, powder or granule; orally as an emulsion, solution, suspension, syrup, or elixir; parenterally; or rectally.

35. The method according to claim 34, wherein the therapeutically effective amount administered is from about 2.5 mg to about 15 mg per day.

36. The method according to claim 33, wherein 6-(5-chloro-2-pyridyl)-5-[(4-methyl-1-piperazinyl)-carbonyloxy]-7-oxo-6,7-dihydro-5H-pyrrolo [3,4-b] pyrazine, or a pharmaceutically acceptable salt thereof, in the form of its dextrorotatory isomer, is administered together with a pharmaceutically acceptable carrier.

37. A method of treatment of disorders that are affected by the binding of agonists to central nervous system benzodiazepine receptors in a human comprising administering to a human in need of such treatment, a therapeutically effective amount of 6-(5-chloro-2-pyridyl)-5-

PRELIMINARY AMENDMENT

U.S. Appln. No.: [Continuation based on 09/124,651]

[(4-methyl-1-piperazinyl)-carbonyloxy]-7-oxo-6,7-dihydro-5H-pyrrolo [3 ,4-b] pyrazine, or a pharmaceutically acceptable salt thereof, in the form of its dextrorotatory isomer.

38. The method according to claim 37, wherein 6-(5-chloro-2-pyridyl)-5-[(4-methyl-1-piperazinyl)-carbonyloxy]-7-oxo-6,7-dihydro-5H-pyrrolo [3 ,4-b] pyrazine, or a pharmaceutically acceptable salt thereof, in the form of its dextrorotatory isomer, is administered orally as a solid as a tablet, pill, powder or granule; orally as an emulsion, solution, suspension, syrup, or elixir; parenterally; or rectally.

39. The method according to claim 38, wherein the therapeutically effective amount administered is from about 2.5 mg to about 15 mg per day.

40. The method according to claim 37, wherein 6-(5-chloro-2-pyridyl)-5-[(4-methyl-1-piperazinyl)-carbonyloxy]-7-oxo-6,7-dihydro-5H-pyrrolo [3 ,4-b] pyrazine, or a pharmaceutically acceptable salt thereof, in the form of its dextrorotatory isomer, is administered together with a pharmaceutically acceptable carrier.

41. A method of treatment of anxiety in a human comprising administering to a human in need of such treatment, a therapeutically effective amount of 6-(5-chloro-2-pyridyl)-5-[(4-methyl-1-piperazinyl)-carbonyloxy]-7-oxo-6,7-dihydro-5H-pyrrolo [3 ,4-b] pyrazine, or a pharmaceutically acceptable salt thereof, in the form of its dextrorotatory isomer.

42. The method according to claim 41, wherein 6-(5-chloro-2-pyridyl)-5-[(4-methyl-1-piperazinyl)-carbonyloxy]-7-oxo-6,7-dihydro-5H-pyrrolo [3 ,4-b] pyrazine, or a pharmaceutically acceptable salt thereof, in the form of its dextrorotatory isomer, is administered

PRELIMINARY AMENDMENT

U.S. Appln. No.: [Continuation based on 09/124,651]

orally as a solid as a tablet, pill, powder or granule; orally as an emulsion, solution, suspension, syrup, or elixir; parenterally; or rectally.

43. The method according to claim 42, wherein the therapeutically effective amount administered is from about 2.5 mg to about 15 mg per day.

44. The method according to claim 41, wherein 6-(5-chloro-2-pyridyl)-5-[(4-methyl-1-piperazinyl)-carbonyloxy]-7-oxo-6,7-dihydro-5H-pyrrolo [3,4-b] pyrazine, or a pharmaceutically acceptable salt thereof, in the form of its dextrorotatory isomer, is administered together with a pharmaceutically acceptable carrier.

45. A method of increased duration of sleep in a human comprising administering to a human in need of such increased duration of sleep, a therapeutically effective amount of 6-(5-chloro-2-pyridyl)-5-[(4-methyl-1-piperazinyl)-carbonyloxy]-7-oxo-6,7-dihydro-5H-pyrrolo [3,4-b] pyrazine, or a pharmaceutically acceptable salt thereof, in the form of its dextrorotatory isomer.

46. The method according to claim 45, wherein 6-(5-chloro-2-pyridyl)-5-[(4-methyl-1-piperazinyl)-carbonyloxy]-7-oxo-6,7-dihydro-5H-pyrrolo [3,4-b] pyrazine, or a pharmaceutically acceptable salt thereof, in the form of its dextrorotatory isomer, is administered orally as a solid as a tablet, pill, powder or granule; orally as an emulsion, solution, suspension, syrup, or elixir; parenterally; or rectally.

47. The method according to claim 46, wherein the therapeutically effective amount administered is from about 2.5 mg to about 15 mg per day.

PRELIMINARY AMENDMENT

U.S. Appln. No.: [Continuation based on 09/124,651]

48. The method according to claim 45, wherein 6-(5-chloro-2-pyridyl)-5-[(4-methyl-1-piperazinyl)-carbonyloxy]-7-oxo-6,7-dihydro-5H-pyrrolo [3 ,4-b] pyrazine, or a pharmaceutically acceptable salt thereof, in the form of its dextrorotatory isomer, is administered together with a pharmaceutically acceptable carrier.

49. A method of increased quality of sleep in a human comprising administering to a human in need of such increased quality of sleep, a therapeutically effective amount of 6-(5-chloro-2-pyridyl)-5-[(4-methyl-1-piperazinyl)-carbonyloxy]-7-oxo-6,7-dihydro-5H-pyrrolo [3 ,4-b] pyrazine, or a pharmaceutically acceptable salt thereof, in the form of its dextrorotatory isomer.

50. The method according to claim 49, wherein 6-(5-chloro-2-pyridyl)-5-[(4-methyl-1-piperazinyl)-carbonyloxy]-7-oxo-6,7-dihydro-5H-pyrrolo [3 ,4-b] pyrazine, or a pharmaceutically acceptable salt thereof, in the form of its dextrorotatory isomer, is administered orally as a solid as a tablet, pill, powder or granule; orally as an emulsion, solution, suspension, syrup, or elixir; parenterally; or rectally.

51. The method according to claim 50, wherein the therapeutically effective amount administered is from about 2.5 mg to about 15 mg per day.

52. The method according to claim 49, wherein 6-(5-chloro-2-pyridyl)-5-[(4-methyl-1-piperazinyl)-carbonyloxy]-7-oxo-6,7-dihydro-5H-pyrrolo [3 ,4-b] pyrazine, or a pharmaceutically acceptable salt thereof, in the form of its dextrorotatory isomer, is administered together with a pharmaceutically acceptable carrier.

PRELIMINARY AMENDMENT

U.S. Appln. No.: [Continuation based on 09/124,651]

53. A method of reduction of the number of awakenings during sleep in a human comprising administering to a human in need of such reduction, a therapeutically effective amount of 6-(5-chloro-2-pyridyl)-5-[(4-methyl-1-piperazinyl)-carbonyloxy]-7-oxo-6,7-dihydro-5H-pyrrolo [3 ,4-b] pyrazine, or a pharmaceutically acceptable salt thereof, in the form of its dextrorotatory isomer.

54. The method according to claim 53, wherein 6-(5-chloro-2-pyridyl)-5-[(4-methyl-1-piperazinyl)-carbonyloxy]-7-oxo-6,7-dihydro-5H-pyrrolo [3 ,4-b] pyrazine, or a pharmaceutically acceptable salt thereof, in the form of its dextrorotatory isomer, is administered orally as a solid as a tablet, pill, powder or granule; orally as an emulsion, solution, suspension, syrup, or elixir; parenterally; or rectally.

55. The method according to claim 54, wherein the therapeutically effective amount administered is from about 2.5 mg to about 15 mg per day.

56. The method according to claim 53, wherein 6-(5-chloro-2-pyridyl)-5-[(4-methyl-1-piperazinyl)-carbonyloxy]-7-oxo-6,7-dihydro-5H-pyrrolo [3 ,4-b] pyrazine, or a pharmaceutically acceptable salt thereof, in the form of its dextrorotatory isomer, is administered together with a pharmaceutically acceptable carrier.

57. The dextrorotatory isomer of 6-(5-chloro-2-pyridyl)-5-[(4-methyl-1-piperazinyl)-carbonyloxy]-7-oxo-6,7-dihydro-5H-pyrrolo [3 ,4-b] pyrazine, and pharmaceutically acceptable salts thereof.

PRELIMINARY AMENDMENT

U.S. Appl. No.: [Continuation based on 09/124,651]

58. The dextrorotatory isomer according to claim 57, wherein the pharmaceutically acceptable salts are salts of mineral acids, or substitution derivatives thereof, selected from the group consisting of chlorohydrates, sulfates, nitrates, and phosphates.

59. The dextrorotatory isomer according to claim 57, wherein the pharmaceutically acceptable salts are salts of organic acids, or substitution derivatives thereof, selected from the group consisting of acetates, propionates, succinates, benzoates, fumarates, tartates, theophyllineacetates, salicylates, phenolphthalinates, and methylene-bis- β -oxynaphthoates.

60. A composition comprising the dextrorotatory isomer of 6-(5-chloro-2-pyridyl)-5-[(4-methyl-1-piperazinyl)-carbonyloxy]-7-oxo-6,7-dihydro-5H-pyrrolo [3,4-b] pyrazine, or a pharmaceutically acceptable salt thereof.

61. The composition according to claim 60, wherein the pharmaceutically acceptable salt is a salt of a mineral acid, or substitution derivatives thereof, selected from the group consisting of chlorohydrates, sulfates, nitrates, and phosphates.

62. The composition according to claim 60, wherein the pharmaceutically acceptable salt is a salt of an organic acid, or substitution derivatives thereof, selected from the group consisting of acetates, propionates, succinates, benzoates, fumarates, tartates, theophyllineacetates, salicylates, phenolphthalinates, and methylene-bis- β -oxynaphthoates.

63. A pharmaceutical composition comprising an effective amount of the dextrorotatory isomer of 6-(5-chloro-2-pyridyl)-5-[(4-methyl-1-piperazinyl)-carbonyloxy]-7-oxo-6,7-dihydro-5H-pyrrolo [3,4-b] pyrazine, or a pharmaceutically acceptable salt thereof, and a pharmaceutically acceptable carrier.

PRELIMINARY AMENDMENT

U.S. Appln. No.: [Continuation based on 09/124,651]

Sub 62
64. The pharmaceutical composition according to claim 63, wherein the pharmaceutically acceptable salt is a salt of a mineral acid, or substitution derivatives thereof, selected from the group consisting of chlorohydrates, sulfates, nitrates, and phosphates.

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65. The pharmaceutical composition according to claim 63, wherein the pharmaceutically acceptable salt is a salt of an organic acid, or substitution derivatives thereof, selected from the group consisting of acetates, propionates, succinates, benzoates, fumarates, tartates, theophyllineacetates, salicylates, phenolphthalinates, and methylene-bis- β -oxynaphthoates.

66. The pharmaceutical composition according to claim 63, wherein the therapeutically effective amount of the dextrorotatory isomer of 6-(5-chloro-2-pyridyl)-5-[(4-methyl-1-piperazinyl)-carbonyloxy]-7-oxo-6,7-dihydro-5H-pyrrolo [3,4-b] pyrazine, or a pharmaceutically acceptable salt thereof, is from about 2.5 mg to about 15 mg.

67. The pharmaceutical composition according to claim 63, wherein the pharmaceutically acceptable carrier comprises a diluent, lubricant, sweetener, aromatic, or additive, or combinations thereof.

68. The pharmaceutical composition according to claim 67, wherein the additive is a wetting agent, emulsifier, dispersing agent, or combinations thereof. 5/20-22